MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2018/2019

PBM0054 – MATHEMATICS
(Foundation in Business)

31 MAY 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FIVE** questions.

2. Attempt **ALL** five questions. The distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

QUESTION 1

a.   Simplify: $\left(\dfrac{-7a^5b^4c^2}{3a^{-2}b^5c^{-4}}\right)^{-4}$.   (3 marks)

b.   Simplify: $\dfrac{\dfrac{1}{y^2}-1}{1+\dfrac{1}{y}}$.   (4 marks)

c.   Factor: $3(x+1)^2 + 2(x+1) - 21$.   (4 marks)

d.   Solve: $\sqrt{2a+11} - \sqrt{5a+1} + 1 = 0$.   (10 marks)

e.   Determine the domain of the function: $f(x) = \dfrac{\sqrt{x}}{8x^3 - 27}$.   (4 marks)

(Total = 25 marks)

QUESTION 2

Solve for x in the following equations:

a. $5 + e^{x+1} = 18$ (3 marks)

b. $3x\,a^{6\log_a x} = 384$ (4 marks)

c. $\log[\log_{12}(3 + \log_2(x+5))] = 0$ (5 marks)

(Total = 12 marks)

QUESTION 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$x - 2y - 2z - 3 = 0$$
$$2x - 4y + 4z - 1 = 0 \qquad \text{(13 marks)}$$
$$3x - 3y - 3z - 4 = 0$$

(Total = 13 marks)

Continued…

QUESTION 4

a.　　Find the $\dfrac{dy}{dx}$ for the given functions and simplify the answers.

　　i.　　$y = \left(\dfrac{x^2}{36} + \dfrac{2}{\sqrt[4]{x^3}} - \dfrac{x^{-6}}{4}\right)^4$　　　　　　　　　　　(5 marks)

　　ii.　　$y = \dfrac{(2x-3)^2}{(x+2)^3}$　　　　　　　　　　　　　　　　(5 marks)

　　iii.　　$y = 4x^3\left(x^4 - x^2 + 5\right)^5$　　　　　　　　　　　(5 marks)

b.　　Find　$\dfrac{d^2 y}{du^2}$　for　$y = 5\sqrt[3]{u}\left(4u^{-\frac{3}{2}} + u^{-2} + 2u\right)$.　　　　(5 marks)

c.　　Find the equation of the tangent line to the curve $y = 3\sqrt{x} + \dfrac{1}{2\sqrt{x}}$ at $x = 4$.

　　　　　　　　　　　　　　　　　　　　　　　　　　(5 marks)

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QUESTION 5

a.　　Integrate each of the following integral.

　　i.　　$\displaystyle\int \dfrac{2x^5 - 7x^{\frac{1}{4}}}{3x^2}\, dx$　　　　　　　　　　　　　　(3 marks)

　　ii.　　$\displaystyle\int_1^8 \left(x^2 - 6\right)\left(3 + \sqrt[3]{x}\right) dx$　　　　　　　　　　　(8 marks)

　　iii.　　$\displaystyle\int_2^3 \dfrac{5x^2}{\sqrt{x^3 + 8}}\, dx$　　　　　　　　　　　　　(7 marks)

b.　　An environmentalist finds that a certain type of tree grows in such a way that its height $h(t)$ after t years is changing at the rate of

$$h'(t) = 0.2t^{\frac{2}{3}} + \sqrt{t} \quad \text{feet/ year.}$$

　　If the tree was 2 feet tall when it was planted, how tall will it be in 27 years?

　　　　　　　　　　　　　　　　　　　　　　　　　　(7 marks)

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